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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/067,812	02/08/2002	Yasukazu Iwasaki	040356-0424	8928

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3000 K STREET NW  
WASHINGTON, DC 20007

EXAMINER
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MERCADO, JULIAN A

ART UNIT	PAPER NUMBER
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1745

DATE MAILED: 06/03/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/067,812

Applicant(s)

IWASAKI ET AL.

Examiner

Julian Mercado

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-13 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-4 and 9-13 is/are rejected.
- 7) ☒ Claim(s) 5-8 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 3/13/03, 2/8/02
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_

## DETAILED ACTION

### *Claim Rejections - 35 USC § 102*

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-4 and 9-12 are rejected under 35 U.S.C. 102(b) as being anticipated by Okamoto (U.S. Pat. 6,045,933).

Regarding independent claim 1, Okamoto teaches a solid oxide fuel cell system having a fuel cell [30], an exhaust circulation passage [52] for both the anode and cathode side of the fuel cell, and a vaporizer [54], i.e. burner. (col. 3 line 16-18, col. 43-48, also applies to dependent claims 9, 10, 11) As to the claimed “fuel injection mechanism”, this feature is given its broadest reasonable interpretation within its functional definition in the claim as one that “injects liquid fuel”. To this extent, a methanol tank [12] is considered to inject liquid fuel, i.e. liquid methanol into the reformer [14] by way of its connecting conduit. (portion in diagram indicated by “CH<sub>3</sub>OH”) As to the vaporizer [54] vaporizing the injected fuel, Okamoto discloses that “[u]nder an applied heat of the burner 54, steam reforming of methanol is conducted” which, as further disclosed, generates fuel gas. (col. 3 line 43-51) That is, the heat from the burner drives the endothermic reforming reaction which vaporizes the liquid methanol into hydrogen gas. The reforming occurs in external reformer [14] upstream of the fuel cell. (applies to dependent claim 12) A pump [62] serves as a circulation blower. (col. 3 line 34-38, applies to dependent claim 2)

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As to a water feeder which supplies water to the circulated portion of the exhaust gas, a humidifying means [164] humidifies the hydrogen gas. (col. 8 line 48-58, applies to dependent claim 3) While the claimed "water injection mechanism" in dependent claim 4 is similarly given its broadest reasonable interpretation consistent with the claimed "fuel injection mechanism" as discussed above, notwithstanding Okamoto specifically teaches an injector for this purpose. (col. 8 line 51)

### *Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Okamoto as applied to claims 1-4 and 9-12 above, in view of Hsu (U.S. Pat. 5,747,185)

The teachings of Okamoto are discussed above.

Okamoto does not explicitly teach performing internal reforming. However, Hsu teaches internal reforming of a fuel cell as an improvement over an external reforming configuration. (compare Figure 1 and Figure 5) The skilled artisan would find obvious to perform internal reforming for reasons such as compacting of the fuel cell and conservation of energy that would otherwise be expended in external reformation.

***Allowable Subject Matter***

Claims 5 and 6 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: the prior art of record and to the examiner's knowledge do not teach or render obvious, at least to the skilled artisan, the instant invention regarding, in a first embodiment, a water feeder installed on the vaporizer. This feature is precluded in Okamoto as the portion thereof relied upon in this rejection, namely, burner [54] as the vaporizer and humidifying means [164] as the water feeder are disclosed as separated components. (refer to Figure 9)

Claims 7 and 8 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: the prior art of record and to the examiner's knowledge do not teach or render obvious, at least to the skilled artisan, the instant invention regarding, in a second embodiment, sensors which detect steam and fuel in the circulated gas exhaust gas. While sensors for detection of steam and fuel are known in the art (see, for example, U.S. Pat. 6,083,637 to Walz et al.), the prior art of record does not teach or render obvious, at least to the skilled artisan, placement of these sensors within a *circulated* gas exhaust stream. [emphasis added]

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*Conclusion*

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Julian Mercado whose telephone number is (571) 272-1289. The examiner can normally be reached on Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick J. Ryan, can be reached on (571) 272-1292. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.



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